

Guidelines for Microfilming Public Records

**Developed by the
Local Records Preservation Program,
Missouri State Archives**

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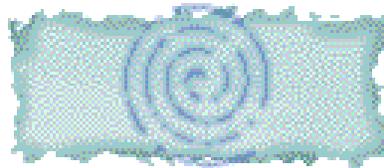


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Other records management publications available through the [website of the Secretary of State](#) include:

- [Conservation Notes](#) (brief technical leaflets on care of records)
- [Digital Imaging Guidelines](#)
- [E-Mail Records Guidelines](#)
- [Preservation Concerns in Planning a Records Center](#)
- [Retention Schedules for County & Municipal Offices & Governmental Districts](#)
- [Statement on Acceptance of Microfilm Created from Digital Sources](#)
- [Supplies & Services for Preservation](#) (a list of vendors)

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<http://www.sos.mo.gov/archives/localrecs/program.asp>

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1. Introduction

One of the many services provided by the Local Records Preservation Program (a division of the Missouri State Archives) is promoting records management through the appropriate use of microfilm. The staff of the Local Records Program has prepared these guidelines to help local officials ensure that their microfilm meets the necessary criteria to ensure it will be a permanent and useful replacement for paper records.

In an age when computers increasingly pervade every aspect of daily life, microfilm has remained a reliable way to preserve permanent and historical documents. The Secretary of State's Office follows the standards set forth by the American National Standards Institute and the National Archives in accepting microfilm as the only reliable way to substitute for paper records.

Microfilm is accepted as evidence in legal proceedings. Missouri law on public and business records specifies that microfilm copies are legally admissible as evidence in lieu of the original (RSMo 109.130). The conditions governing the admissibility of microfilm require that the micrographic, photostatic, or photographic reproductions of the original writings or records meet the guidelines of RSMo 109.120.

Optical disc systems, such as CD or DVD, have many advantages, but that technology *cannot* create archivally secure information. Among the advantages are improved access and easy dissemination of information. However, digital media have short life expectancy due to evolving technology, and these digital media cannot be considered an archival format. Additional information about electronic records is available *through the Secretary of State's website* at <http://www.sos.mo.gov/records/recmgmt/resources.asp>.

In many organizations, microfilm is being viewed as a "platform for digital access." That is, archives and records offices are recognizing that only microfilm can provide the longevity that is required, but they are also embracing the use of digital technologies for enhanced access (including Web access) to the records. In this "hybrid-system" approach, offices create microfilm that meets the requirements outlined in these *Guidelines* with the intent to migrate the film images to a digital format – either immediately, or sometime in the future. By following the specifications offered in these *Guidelines*, you can have the best of both worlds: a permanent microfilm product that will meet the long-term needs of users, and a product that can be migrated efficiently to a digital format.

Even when an official commits to microfilm the permanent records – either to ensure the safety of the records or to reduce storage space requirements – room still exists for error. It is not enough merely to ensure the microfilm is legible. The longevity and usefulness of microfilm requires that standards be followed in all these areas:

- ❖ The film must be on polyester base, and it must have an LE (for "life expectancy") rating of 500 years.
- ❖ Photographic work at the camera must follow standards to ensure a user-friendly product.
- ❖ Processing and duplication of the film must conform to national standards.
- ❖ Quality-control inspections must be done to ensure conformity with standards and instructions.
- ❖ The film must be stored in a facility that meets national standards for temperature, humidity, air quality, and other factors.

Education is necessary for vendors and local government officials who are just beginning to explore the world of high-quality preservation microfilming. These *Guidelines for Microfilming Public Records* outline the standards that will ensure your information will be secure and available in the future. They also offer recommendations about specifications that will facilitate the migration of microfilm to

a digital format. These guidelines must be followed to ensure that long-lasting, readily usable microfilm is created.

If you receive a grant from this office, you must follow these *Guidelines*. Therefore, it is recommended that you share this publication with your vendor, so that the vendor can assure you that all standards can be met and that the microfilm will not be rejected after Local Records inspection. Having these *Guidelines* in hand may also affect the vendor's cost estimate; since these specifications are more strict than conventional office microfilming, the prices for *preservation* microfilming will generally be higher.

If you are microfilming with your own funds and are interested in storing the master copy of your permanent records on microfilm in the vault at the State Archives, your film must meet these standards. Therefore, your staff must assure that the film conforms to the specifications described in these *Guidelines*.

If you are filming independently and have no wish to store your film with the Archives, this information will still provide you with specifications to ensure that you get the high-quality product you want.

We applaud your efforts to mainstream your office through more efficient records management and your foresight to preserve Missouri's heritage through its historical documents.

2. When to Microfilm

In deciding whether a local government needs a microfilming program, the following should be considered:

- ❖ Microfilm can reduce the space devoted to records storage by 98 percent by replacing paper records.
- ❖ Microfilm can simply provide a backup security copy for paper records.
- ❖ Microfilm can eliminate excessive wear on the original records by providing a surrogate for viewing.
- ❖ Microfilm can allow greater efficiency in serving the record needs of the public since a user/reference copy can be stored locally rather than in a records storage facility.
- ❖ Microfilm can solve your need for sharing the same information with other departments, divisions, etc.
- ❖ Microfilm can insure the safety of records that are to be retained for longer than 20 years. Records with less than 20 years retention generally should not be filmed.
- ❖ Microfilm can help to assure file integrity, accuracy, and completeness.
- ❖ Microfilm can serve as a platform for digital access, allowing for effective migration to Internet access.

Many officials microfilm records to protect vital information. Records filmed for this purpose generally fall into three categories:

1. Records required to be retained for long periods.
2. Records that protect the rights of citizens.
3. Records having historical value.

Most records that fall into the first two categories also have historical value. Before commencing any microfilming project, consult the appropriate local records retention schedules to determine how long specific records must be retained. These *retention schedules are available on the Secretary of State's website* at: <http://www.sos.mo.gov/archives/localrecs/schedules/>

Although there are many advantages to having a microfilming program, a few cautionary notes are appropriate:

- ❖ The cost of developing a microfilm system is very high. Creating microfilm is best left to vendors or in-house operations that are already experienced in the creation of film.
- ❖ Citizens who have not used microfilm before may be reluctant to use it instead of paper records. If you create and provide *high-quality* microfilm, that user resistance will be reduced.
- ❖ Great care must be taken to ensure that a quality product is produced since the microfilm may be the only record the government will have of some transactions. Therefore, a large investment of time is required to review the microfilm before it is accepted into your collections.

3. Types of Programs

Once a local government decides to implement a microfilm program, the question arises as to what type of program to support. There are several options.

1. The option that is simplest and generally most cost-effective is to contract with a microfilm service bureau. Appendix A offers some advice about working with microfilm service vendors, and a list of microfilm bureaus in Missouri is available at <http://www.sos.mo.gov/archives/localrecs/conservation/vendor/microfilm.asp>
2. Local records officials may be awarded Local Records grants to cover the cost of capturing permanent public records on high-quality ("archival") microfilm and the cost of acquiring microfilm reader/printers to allow access to the microfilm. The grant application guidelines are at <http://www.sos.mo.gov/archives/localrecs/grants/>.
3. On occasion, the Local Records Program will partner with a county or municipal government to process a collection with a view toward microfilming. In those cases, the local office must provide personnel (staff and/or volunteers) and space to process/organize the records. The Local Records Program will train personnel and provide archival boxes and some supplies. Then the records may be microfilmed by the local office or through a grant from the Local Records Preservation Program.
4. The Local Records Preservation Program occasionally targets small-quantity series of historical records to be microfilmed at the State Archives. Contact 573-751-9047 or e-mail local.records@sos.mo.gov to explore that possibility.

Regardless of the type of program, all film must meet three criteria: archival quality (how long the film will last); legality (properly targeted, properly documented); and image quality.

4. Technical Guidelines

4.1. Archival Requirements

To meet archival requirements film **MUST** be manufactured, processed and stored according to American National Standards Institute (ANSI) and International Standards Organization (ISO) standards. Archival requirements establish the permanence or life expectancy of the film. Please see Appendix B for a list of relevant standards and other published guidelines.

4.1.1. Manufacturing Requirements

Manufacturing plays an important role in the longevity of the film. The film used for the master negative (i.e., camera film) must have the following qualities:

- gelatin silver halide emulsion
- polyester-based
- 4 mil or thicker (i.e., no "thin film")
- processed to a silver gelatin black-and-white photographic image
- LE-rating ("life-expectancy" rating) of 500 years – usually expressed as "LE-500"
- 35mm width. Documents smaller than 8½ x 11 inches may be filmed on 16mm microfilm. Local Records grant projects may only use 16mm film if the Local Records Division gives written approval *prior* to the beginning of filming.

4.1.2. Duplicates

A duplicate negative printing master should be created from the master film, and it must meet the same technical requirements as specified in section 4.1.1.

The printing negative should be used to create a service copy for use by the public. Service-copy film may be produced on either polyester-based silver or diazo film stock; diazo is considerably less expensive. Film used for the service copy should have at least an LE-100 rating.

4.1.3. Leader and Trailer

Microfilm produced with Local Records grant funds must include leader and trailer on each reel. 'Leader and trailer' is blank film found at the beginning and end of a reel. The leader and trailer each must be a minimum of four feet long.

4.1.4. Processing

Proper processing of the film is the second step toward ensuring an archival film is produced. ANSI and ISO standards require that a conventional process be used, such as a Kodak Prostar or Allen deep tank processor. (See illustrations in Figures 1-3.) This simply means that the film must be processed using a developer, a fixer, a wash, and a dry cycle. These should be individual tanks and not a mixture of any two as in monobath processing.

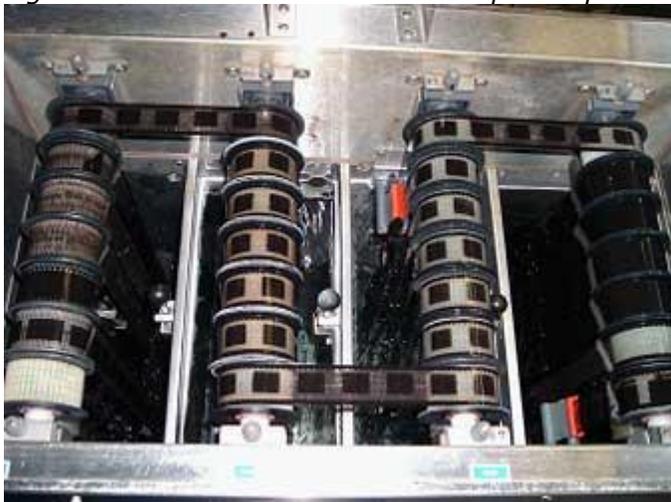
Figure 1. Kodak Prostar processor



Figure 2. Allen deep tank processor



Figure 3. Inside view of an Allen deep tank processor



While full reversal processing is considered an archival method of processing, Missouri's Records Divisions do not, at this time, use this method. The proper processing of film is crucial to permanent quality.

Whether sent to a film lab for processing or to a service bureau, a methylene blue test should be performed each day that film is processed. (A typical testing station is shown in Figure 4.) This test checks for residual thiosulfate and will ensure that the film has been washed properly of any excessive amounts of chemicals, which can eventually deteriorate the film. A copy of the test results should accompany the film. If the test results reveal film that does not meet the standards, then the materials should be re-filmed or the film should be rewashed. Maximum permissible concentration is .014. Test results should be confirmed periodically by an outside source such as Kodak or OCLC Online Computer Library Center, Inc.

Note: Improperly washed films with unacceptable levels of residual thiosulfate should not be stored with other films.

Figure 4. Methylene blue testing station, with test tubes, testing solutions, and equipment.



Polysulfide treatment. Post-processing microfilm treatments are available to help guard against oxidative attack from atmospheric pollutants, called **redox** or **red spots**. Either SilverLock (created by the Image Permanence Institute and currently manufactured by OCLC Online Computer Library Center, Inc.) or Brown Tone (created and manufactured by Kodak), can be used to help protect film. SilverLock has been proven to convert the silver in film to silver sulfide making the images more stable. If a polysulfide treatment is not used and the film is stored in a less than optimum environment, the information on the film could be obliterated and lost forever. Treatment should be considered as an optional service whenever available. It is strongly recommended but not required.

4.1.5. Storage

Proper storage of film is the last important step in film maintenance.

- ❖ Film housings/storage cabinets should be made of non-corroding, non-deteriorating, and non-ferrous metals or plastics.
- ❖ Button-and-string ties (illustrated in Figure 5) are appropriate for securing film on the reel as long as they meet the appropriate standards. (See Appendix B.) They are *recommended but not required* in projects funded by the Local Records Program. Do not use tape, strings, rubber bands, or adhesives to secure or fasten film for storage.

Figure 5. Button-and-string tie



- ❖ Cardboard boxes used for storage should be acid-free and lignin-free. When purchasing film or storage boxes, always ensure that the items meet national and international standards for archival storage including the Photographic Activity Test (PAT).
- ❖ Storage areas should be environmentally controlled to the proper temperature and humidity. The international standard, ISO 18911:2010, specifies conditions for master microfilm negatives.
 - Polyester-based silver film requires a temperature cooler than 70°F (2°C); 50-59°F is preferred. The temperature should not vary $\pm 3^\circ$ F in a 24-hour period. The relative humidity for polyester-base film should have a set-point between 25% and 45%, and should not vary more than $\pm 5\%$ during a 24-hour period.
 - Cooler storage is critically important for older cellulose-base film (nitrate and acetate). The maximum temperature is 45°F and relative humidity should be 20-30%. The same daily fluctuations apply for cellulose-based film as for polyester film.
- ❖ The film must also be protected from airborne gases, dirt particles or other contaminants. The storage area should have a separate heating/ventilation/air conditioning (HVAC) system. Whenever the storage area is to be sprayed or painted, all films should be moved off-site until the air has been re-purified. The length of time required will be dependent on the environment, equipment, and chemistry of the spray or paint.

Unfortunately, ideal storage conditions are rarely found in courthouses, city halls, and typical "office" facilities. We recommend that you locate an off-site facility with temperature and humidity readings that remain consistent. Several storage companies exist that specialize in the long-term, secure storage of paper and film. In general, bank vaults are not

recommended since they are not in the business of storing large volumes of records for other entities. **Under no circumstances** should the original camera film be stored in spaces that do not meet the strict temperature and humidity standards outlined above. In addition, remote storage should be considered so that at least one copy of the film is stored in a different location. This remote location will provide security against catastrophic loss during a natural disaster or other disasters caused by human forces.

The Missouri General Assembly authorized the building of the Kirkpatrick State Information Center, which includes a vault equipped with the proper storage requirements and the capacity to store microfilm from local and state government. Resembling a huge refrigerator, the vault is kept at the optimal humidity and temperature conducive for long-term storage of microfilm. This service is free of charge, and will continue as long as there is available space for local government film.

If you are interested in having your silver original camera master reels stored at the State Information Center, those reels will have to meet the same requirements as those listed under the Grant Requirements section. The records filmed will have to be either permanent or of historical significance, and the film must meet quality control specifications set by Local Records.

Microfilmed records stored at the Archives are open, public records. They are available for research in Archives reading room. Duplicates are available to the public.

Contact the Local Records Preservation Program (573-751-9047 or e-mail local.records@sos.mo.gov) for more information. Local Records can determine if your microfilm is eligible for storage and provide you with an agreement form. Selected exceptions may be made for microfilm produced long ago where original documents are not available and film is below industry standards. If you have film that requires evaluation, please send it to:

Missouri State Archives
Local Records Program Vault Storage
P. O. Box 1747
Jefferson City, MO 65102

Upon arrival, the records will be inspected for quality. Unacceptable reels will be sent back for either re-filming or storage at your facilities. Microfiche is not eligible for State Archives storage.

4.2. Image Quality

Image quality is the next important aspect of a good microfilm program. Image quality establishes how well the materials can be read on film. It is determined objectively by measuring the density and resolution of the film, the reduction that was used, and the completeness of the film.

All film should qualify as permanent according to the minimum specifications of ANSI/ISO.

The Local Records Preservation Program suggests initial quality control checks on the first reel of film produced, prior to subsequent filming. Inspecting this "pilot" reel will allow you to find any serious quality or bibliographic problems with the vendor's product. All subsequent film should be inspected to ensure that it continues to meet the quality control standards.

4.2.1. Density

Density is the method of determining the darkness or lightness of an image on film. As with any photographic image, if the image is too dark or too light, the legibility is compromised.

The density test is done with a piece of equipment called a transmission densitometer, which measures the amount of light that travels through the film. (See Figure 6.)

Figure 6. As part of the quality-control inspection, the density of the film must be checked with a densitometer.



Two uniform density targets are filmed at the beginning and end of each roll. The uniform density target can be as simple as a blank sheet of white bond paper, but ***it must be as large as, or larger than, the materials being filmed.***

After the film is processed, the microfilm frames containing these targets are placed on the densitometer. Take a minimum of three readings from the center of the image, at the top, middle and bottom; take five readings from the four corners and center. The density should not vary more than .15. Readings should also be taken on the images of material, at least 8 readings on a 100-foot reel and at least 11 readings from a 215-foot reel. Readings should be taken close to the text but not on the text in an area that best represents the majority of the background of the material. Readings should not be taken near the edge of the page or on an area that is stained, faded, or has bleed-through from the text on the opposite page. There may be exceptions to this rule depending on the condition of the material.

In order to ensure that exposures are being filmed at an appropriate density, tests, such as a step test, should be performed prior to any project being started. Step tests are targets filmed at different settings, to determine the best setting on which to film certain documents. If you are working in an in-house film lab, your equipment service vendor should be able to show you how to perform this test when installing the equipment. If you are using a vendor, you should ensure that they are performing the appropriate tests. The target originally used for the step test should remain in use until it becomes soiled. The target should then be replaced with a sheet of white bond paper, or other material, of the same thickness and shade as the previous one. If this is not possible, a new step test should be conducted using the new target. The Local Records staff will check step tests, if submitted.

The acceptable range for density is 0.80 to 1.30. If you have materials that exhibit low contrast between the text and the background (for example, brown ink on a yellowed page), the density should be between 0.80 and 1.00. If you have medium contrast materials, the density should be between 0.90 and 1.10. If your materials are high contrast in nature (for example, black print on white paper), the density should be between 1.00 and 1.30. Extremely low contrast materials may even benefit from density ranges in the .70s. While determining the level of contrast that will yield the best density readings, sometimes it may be difficult to determine the quality of the source material. In those instances, as a basic guideline, handwritten document density should be 0.80 to 1.00 and modern typed documents should be 1.00 to 1.30.

If the contrast on the material is not consistent, it may be necessary to film intentional second exposures of those pages at different densities than the average that has been chosen for the reel. This is also true of materials that contain photos and/or stains.

Acceptable Background Densities	
<i>Background density for the master negative should be based on the characteristics of the original documents.</i>	
High-contrast originals <i>High quality, high-contrast printed materials and black typing. Fine-line originals, black opaque pencil writing. Documents with high-contrast printing.</i>	1.00 - 1.30
Medium-contrast originals <i>Bold text on moderately darkened paper or on light-colored paper. Faded printing. Very small printing. Pencil and ink drawings.</i>	0.90 - 1.10
Low-contrast originals <i>Low-contrast manuscripts and drawings. Documents typed with a worn ribbon. Poorly printed faint documents, especially those on moderately to badly darkened paper. Faint text on tissue, onionskin, or light-colored paper. Text on dark-colored paper. Graph paper with pale, fine colored lines.</i>	0.80 - 1.00
Very low-contrast originals <i>Documents with exceptionally poor contrast between printing/writing and paper.</i>	0.75 - 0.85

Density readings should also be consistent on the reel. This means that there should be less than a 0.20 difference in the average density on the reel. Consistent density, with good contrast between the background of the material and the text, is crucial should the film be digitized later to create images for use in databases or websites.

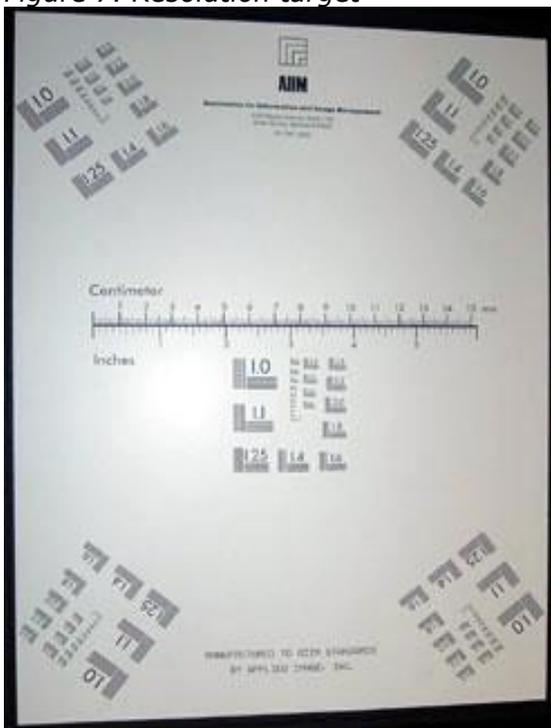
Remember: If you or your vendor are not filming at the correct exposure, your film will appear either too light or too dark, and the characters will appear to blend with the background. If a target is run at the beginning and the end of each roll, this will enable the person taking the density readings to determine if the film has consistent densities from start to end.

4.2.2. Resolution

Resolution is a test that measures whether the film captured the fine detail or clarity of the document. Both a resolution test pattern target (illustrated in Figure 7) and a target containing the reduction ratio used (e.g., on the Camera Operator's Certificate contained in Appendix C of these *Guidelines*) **must** be present on the film, or the measurement cannot be taken.

The resolution test pattern target consists of a series of horizontal and vertical lines with a series of numbers located next to each line pattern. Resolution test pattern targets must conform to the requirements of ISO 3334:2006E (Micrographics - ISO Resolution Test Chart No. 2 - Description and Use). Some vendors are listed at the [Secretary of State website \(http://www.sos.mo.gov/archives/localrecs/grants/fy2010/Vendors_Information.pdf\)](http://www.sos.mo.gov/archives/localrecs/grants/fy2010/Vendors_Information.pdf). **Copies** of resolution targets are **not acceptable**.

Figure 7. Resolution target



Two resolution targets must be filmed at the beginning and end of each reel and any time that the reduction ratio is changed. This target, after being filmed and processed, will be viewed through a 100-power microscope on a light table, as illustrated in Figure 8.

Figure 8. Resolution is measured using a 100-power microscope, viewing the film on a light box.



The smallest distinguishable line pattern number is taken and then multiplied by the reduction ratio used at the time of filming in order to calculate the resolution of the film. For example, the smallest line pattern number distinguished is 9.0 on a reel filmed at a 14:1 reduction ratio. Multiply 9.0 by 14 to get a resolution reading of 126 lines per millimeter (lpm). The higher the resolution reading, the better the legibility of the images on film and the better the results of future digitization will be.

Microfilm must have a minimum resolution of 100 lpm, although 120 lpm is preferred. There is one exception to this requirement: When the reduction ratio is 24x, a resolution of 96 lpm will be accepted.

Film should have consistent resolution throughout the entire image area, the corners, and the center. Therefore, resolution readings should be taken on all five patterns. **Whichever pattern has the lowest resolution is the one that will be used in the calculation.**

The resolution target must be as large as the documents being filmed. Thus, a legal-sized resolution target may be used when filming legal-sized documents. A larger target must be used when filming oversized records.

4.2.3. Reduction Ratio

"Reduction ratio" is a statement about the relationship between the size of the original material as compared to the image on microfilm. This relationship is expressed as a ratio, such as 12:1. This is also commonly referred to as 12X.

The reduction ratio information should appear on the film every time reduction is changed. This information is crucial for future digitization.

The reduction ratio used at the time of filming must be visible (preferably eye-readable) at the beginning of each roll of film. This should be either on the Camera Operator's Certificate or on the "Start" target, and it should be in large bold print. The reduction ratio chosen should be appropriate to the size of the original materials, the orientation of the materials on film, and the film chosen (35mm or 16mm). **The lowest possible reduction ratio should be chosen; the filmed images should approximately fill the frame.** Using a 24:1 reduction ratio when a 12:1 ratio will work is unacceptable. Besides providing the best image, keeping reduction ratios low helps in future projects of digitization and optical character recognition (OCR).

4.2.4. Reduction Changes

Reduction changes should be avoided, especially because they complicate automated scanning of microfilm.

There shall be no more than three reduction changes within a microfilm reel. When filming materials of different sizes, this method is recommended:

- a. Some records (such as municipal ordinance books) have many foldouts throughout the series. If these foldouts are no more than about 30% larger than the base size of the volume, choose the reduction that is appropriate to the size of the foldouts. This method avoids – or at least minimizes – the need to change reductions.
- b. Many loose record series include a range of document sizes. So long as the largest is roughly legal size, choose the fixed reduction that accommodates them.
- c. Some series include oversize items that are significantly larger than the bulk of the records. For example, a group of letter- and legal-size records may also include a

few maps, blueprints, and certificates that are more than 30% larger than the bulk of the records. The following practice is recommended:

1. Flatten the oversize items and move them to separate folders or boxes. Create cross-references between the original location and the oversized housing location as outlined in the next paragraph. [*Note: Oversize boxes and folders may be purchased with LR grant funds for grant-funded projects. Oversize housing may be available from LR for non-grant projects to microfilm permanent records.*]
 2. Within the series, insert a sheet in place of the oversize item, with wording such as "Large document(s) can be found in oversize storage" and reference the box/folder location.
 3. Film the oversize materials at the end of the series, so that only one reduction change is needed.
- d. This method requires careful preparation by the government entity, but provides a high-quality film product that will facilitate research and scanning.

An alternative is "sectional filming" – in which the reduction level remains unchanged, and sections of the large item are filmed in overlapping sections. Guidelines for sectional filming are available in the national standards, but this method has many drawbacks. Contact the LR office before using this method.

When the reduction ratio is changed within the reel, the camera operator must film a new "uniform density target," an eye-legible target specifying the new reduction, and the resolution test target. That same sequence shall be filmed again after filming the oversize materials and returning to the base reduction ratio.

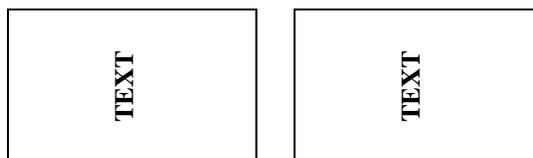
4.2.5. Image Orientation

Microfilming projects funded by Local Records grants must be simplex format (one page filmed at a time – i.e., the IA or IB position) in either the cine (A) or comic (B) position. (See Figure 9.)

Duplex format (two pages filmed at a time, i.e. IIA or IIB) and duo-format (rotary camera parallel imaging) are not acceptable except with written permission from Local Records. Local Records may grant exceptions in certain instances; these will generally be restricted to documents in which two open leaves comprise one document (as sometimes occurs in indexes and tax records). The exception will only be allowed with written approval from LR.

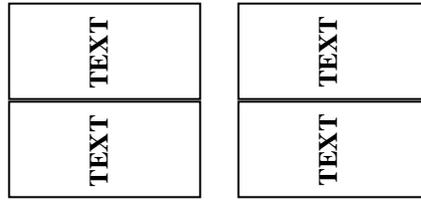
Figure 9.

IA



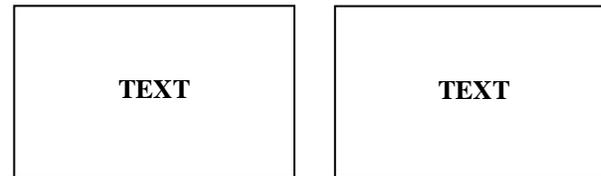
The IA position is recommended for most LR projects

IIA



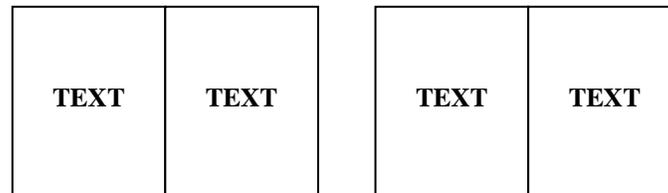
The IIA position is not acceptable, unless permission is granted.

IB



The IB position is allowed in LR projects, especially for documents wider than they are high.

IIB



The IIB position is not acceptable, unless permission is granted.

Suggestions for Reduction Ratio & Orientation Choices	
16mm	Suitable for materials up to 8½" x 11"
35mm	Suitable for materials larger than 8½" x 11"
Cine - "A" position	Suitable up to 17:1
Comic - "B" position	Suitable for materials that will not fit at 17:1 in Cine
1-up (simplex)	Suitable for materials that are or can be disbound
2-up (duplex)	Suitable for materials that cannot be disbound, but only with written exception from LR

The reduction ratio you choose also determines the lens size you will need on the microfilm reader to reproduce the document back to its original form. Most of the newer readers or reader/printers on the market today have multiple size lenses already built in, and these can be changed by a simple adjustment.

4.3. Additional Filming Practices

4.3.1. Skew

Skew is the degree to which the image that appears on film is "off-square" from the film. The more a filmed document is skewed, the more difficult it is to digitize the document, as software must be written or technicians must intervene to adjust the image.

The image shall not be skewed more than 2% (just under 2 degrees) from parallel with the longitudinal axis of the film. Skew shall be measured from the two corners of the document image parallel to the longitudinal edge of the projected image frame.

4.3.2. Baseline Filming

In order to facilitate digitization, camera operators shall position documents so that the lower edge of all pages on a reel shall appear at approximately the same distance from the edge of the film. Baseline filming will simplify an agency's efforts to use edge-detection software in an automated process of scanning microfilm into a digital format.

4.3.3. Intentional Second Exposures

When pages with extreme variation in lightness/darkness of background and color are present in the same frame, the contractor may film the frame more than once, using multiple or special exposures, whenever doing so will allow each part of the image to be captured more effectively.

The exposure required for optimal image capture of one type or portion of an image may vary in another portion of the same frame. Among the types of images for which multiple or special exposure may be required are those characterized by bleed-through or show-through, mottling, multiple-toned or color images, interleaving, overleafing, or multi-faceted openings, pencil markings and fine-lined inscriptions, and documents that have been partially "silked" or "backed."

If a page is intentionally filmed twice – for example, to correct an improper exposure, ensure that an operator did not skip a page, or provide the duplicate exposures required for retakes – the duplicates will be left as filmed; i.e., duplicate frames will not be edited out. However, an excessive number of duplicate exposures due to operator carelessness must be avoided.

The contractor shall make full use of available mechanical/optical means to ensure optimum legibility of information on film while meeting all technical requirements.

Multiple exposures of a page (at different light settings) shall be filmed only when deemed necessary. When the camera operator makes such multiple exposures, s/he shall insert the "Intentional Second Exposure" target before the 2nd exposure.

The "Intentional Second Exposure" target shall not appear as an in-frame target. There shall be no in-frame targets, except as authorized in writing by the Local Records Program.

If the camera operator makes more than one exposure of any image for which normal exposure is inadequate to reproduce the original material, the first shot shall be at the normal exposure and subsequent one(s) shall be at the adjusted exposure(s), not to exceed a total of three exposures per image.

When multiple exposures are made routinely and repeatedly within a folder, series, or collection, the "statement on duplicate images" target shall be filmed as part of the beginning target sequence on each applicable reel. (See *sample in Appendix C.*)

If the total image count of the project exceeds 5% of the estimate, or the contractor projects that possibility during the course of the project, the contractor shall notify the contracting agency.

4.3.4. Blank Pages

When dealing with unpaginated materials such as loose papers and court case files, blank pages shall not be filmed.

Many records are paginated. For example, record books often have pre-printed page numbers. They shall be filmed as follows:

- a. If there is one blank page in a volume, it shall be filmed.
- b. If there are multiple, consecutive blank pages, they shall not be filmed. Instead, a target such as illustrated in Appendix C.15 should be inserted within the volume and filmed in place of the blank pages.
- c. If a volume has many sections of blank pages, it may be more efficient to insert a target in the opening target sequence, informing users of the film that no blank pages are filmed.

4.3.5. Additional Requirements

Microfilm should also meet the following specifications.

- ❖ Spools cannot have plugs.
- ❖ Reels cannot be in cartridges.
- ❖ Reels must be at least $\frac{3}{4}$ full.
- ❖ Film must not have significant scratches.
- ❖ Film must not have fogging (dark areas caused by exposure to light).
- ❖ Film must not have foreign matter adhered to the film.
- ❖ Film must not have images of body parts and other foreign objects. (Fingers used to hold materials in place may be allowed in certain circumstances. Consult the Local Records staff for guidance.)
- ❖ Film must conform to other quality requirements of ANSI/AIIM MS23 (*Standard Recommended Practice - Production, Inspection, and Quality Assurance of First-Generation, Silver Microforms of Documents*)

The Local Records Grant program does not fund microfiche or the creation of aperture cards. The grant program will fund the conversion of aperture cards to roll microfilm.

4.4. Quality Control

Quality control is vital to maintaining image quality. Both density and resolution should be checked frequently during the filming project, and the results should accompany each roll tested (see example of quality report form in Appendix D). For microfilming projects funded by LR, the vendor should submit a copy of the Quality Control Report form with each microfilm reel.

The client should check each reel of film upon completion or upon receipt from the vendor. The Local Records Grant Program requires that a minimum of 10% of all reels be fully checked.

If the density and resolution are not good on the camera master film, the duplicates made from the master may not be readable. Since the third-generation use copies are your work copy, you will want the best possible original that can be produced. The quality of the second-generation printing negative is also vital because it is used to generate the use copies and is typically the copy used in digitization.

All film should be checked for completeness – that is, to ensure that every document has been captured on the film. If the original documents will be destroyed after filming, it is recommended that staff compare 100% of the film against the originals. This inspection can be very labor-intensive and expensive. (See the “Destruction” section below.)

4.5. Legal Requirements

A good microfilm program must also ensure that legal requirements are met. Legal requirements determine whether microfilmed records are accepted as legally binding documents, are admissible in court, and otherwise serve the same purposes as the original paper records.

4.5.1. Missouri

Revised Statutes of Missouri (RSMo) 109.130 states: “Reproduced records deemed original, when. —Such reproduction of the original records *shall be deemed to be an original record for all purposes provided that the reproduction is equal in resolution to microfilm produced under those standards set forth in subsection 4 of section 109.241, and shall be admissible in evidence in all courts or administrative agencies. A facsimile, exemplification or certified copy thereof shall, for all purposes recited in sections 109.120 to 109.140, be deemed to be a transcript, exemplification or certified copy of the original.*”

Missouri law (RSMo 109.241, paragraph 4) requires that microfilm produced for or by the government meet criteria established by organizations such as the American National Standards Institute (ANSI) and International Standards Organization (ISO). Those standards are interpreted by the Division of Records Management and Archives Services. These standards are common in the microfilm industry and can be met by responsible vendors and experienced camera operators.

4.5.2. United States

Title 28, Sections 1731-1739 of the United States Code require records to be:

- ❖ Microfilmed during the regular course of business;
- ❖ Authorized documents of the organization;
- ❖ Created during the regular course of business;
- ❖ Accurate reproductions of original records and not destroyed if their preservation in original paper form is required by law.

4.5.3. Preparation

Government officials should take steps to prepare the records before filming, to ensure the legal admissibility of the film and assure adherence to existing statutes. Key steps are the proper use of targets (see Section 4.4.3) and compliance with image quality standards. When splicing film, proper targeting is necessary to insure information has not been added or deleted from the original records. Splicing is the joining of two pieces of film. *Appendix C* contains samples of targets that should be used.

When records are preserved by microfilm, they must be processed in the following manner: *"When files in the custody of a local governmental agency are microfilmed or otherwise reproduced through photographic, video, electronic, or other reproduction processes, including a computer-generated electronic or digital retrieval system, the public official having custody of the reproduced records shall, before disposing of the originals, certify to the director that the official has made provisions for preserving the microfilms or electronically created records for viewing and recalling images to paper or original form, as appropriate, and that the official has done so in a manner guaranteeing the proper retention and integrity of the records in accordance with standards established by the local records board. Certification shall include a statement, written plan, or reputable vendor's certificate, as appropriate, that any microfilm or document reproduced through electronic process meets the standards for archival permanence established by the United States of America Standards Institute or similar agency, or local records board. If records are microfilmed, original camera masters shall not be used for frequent reference or reading purposes, but copies shall be made for such purposes."* (Section 109.241(4) RSMo)

4.5.4. Corrections & Retakes

Corrections (also called "retakes") are only to be spliced onto the end of the reel. Retakes are errors that are discovered after filming, such as missed documents or pages that do not meet LR's quality-control requirements. The defective pages can be re-filmed and spliced onto the end of the reel. An error can result in the filming of many pages to correct it. Film will be rejected if it contains several errors. **A reel of microfilm will be rejected if the total number of frames re-filmed exceeds 10% of the frames on the reel.**

Splicing should be done with an ultrasonic splicer, but the LR Program will also accept retakes spliced with thermal butt welds. **Absolutely no other splicing methods are allowed**, such as adhesive splicing, use of staples or masking tape. Hole-punching through errors is not allowed without prior written permission.

When filming retakes, the camera operator shall include a uniform density target and a resolution target at the beginning and end of the retake section. The existence of the retake and its location must be identified on the outside of the microfilm reel box; a notation such as "Corrections to this film reel appear at the end of this reel" is acceptable. Retakes should be of a comparable quality to the original film (i.e., resolution and density should match the original).

When filming on a rotary camera, a correction target must immediately follow any camera or paper jams before re-filming the documents.

There shall be no more than one splice on any reel of film (i.e., one for trailer to splice on the retakes).

4.5.5. Destruction

Government agencies shall not destroy original documents until the film product receives Local Records quality control approval and the government office inspects the film for compliance with technical standards, appropriate targets, text legibility, and content completeness. Grantees should anticipate spending roughly one hour per reel to perform a complete bibliographic inspection. This inspection will ensure that the contents of the microfilm are truly complete.

Despite the best efforts of camera operators and vendors, **most large-volume microfilming projects will have some missing original documents.** It is the

responsibility of the government agency that owns the records to do the inspection necessary to identify these, then require remedial filming.

4.6. Preparation for Microfilming

The government office is responsible for preparing the records for microfilming before the records are delivered to the microfilm vendor. LR staff members are available to provide information, guidance, and training.

4.6.1. Physical Preparation

Records must be organized and prepared for filming to ensure the best possible quality and usefulness. Archivists from the Local Records Preservation Program are available to assist in the preparation of records. In LR grant-funded projects, the LR archivists will work closely with government entities to ensure that records have been properly prepared before filming. Even in filming projects not funded by LR grants, the staff may be available to assist in preparation of records. [Contact the Local Records Program](#) for assistance.

Physical preparation generally requires the following steps.

- a. Organize the records to be sure they are in proper order. Generally, records should be arranged within series, then in chronological or alphabetical order.
- b. Remove extraneous materials that do not belong in the records. Remove all duplicates and all non-permanent records. Remove ephemeral items such as grocery lists, bookmarks, and so on.
- c. Clean the records.
 - i. Bound volumes should be vacuumed and dusted if they are dirty.
 - ii. Loose papers should be cleaned, especially if surface dirt obscures text.
 - iii. Instructions are available from the conservation staff, and training may be available.
- d. Remove all fasteners (paper clips, staples, pins, grommets, etc.) so the records are single leaves. Some vendors may be willing to remove fasteners, but they will generally charge extra for that service.
- e. Torn pages may be mended. Use "archival" tape if the records will be retained after filming. Regular or "Scotch" tape is acceptable only if the records will be destroyed after filming.
- f. Unfold and flatten all folded documents. Follow the instructions at <http://www.sos.mo.gov/archives/localrecs/conservation/notes/humidification.asp>. Contact the LR staff for additional guidance.

The physical preparation generally must be done by the local government office. If you are using a vendor for the microfilming, you should discuss with them how they expect to receive the collection. Are they willing to remove staples? Must all of the collection be disbound (loose) pages? Can the binding be removed and destroyed?

4.6.2. Editorial Preparation

When organizing materials for microfilming, try to consider how the microfilm will be used in the future. Citizens may consult the records to ensure their rights. Genealogists may seek information about their ancestors. Historians may seek information about certain trends. Government officials may need to access older records in the course of their business. All these needs will be supported if the records are well organized and logically arranged.

Develop an accurate index or "finding aid" to the records. If the index is relatively straightforward, it should be filmed as part of the opening sequence of targets. If you

develop an extensive finding aid (one that runs more than about 10 pages), film it after the opening sequence.

Prepare targets as outlined in these *Guidelines* and insert them into the proper series, box, file, or volume as appropriate. LR staff can provide more detailed guidance.

4.6.3. Reel Programming

Reel programming is the process of deciding what materials will be filmed on an individual reel of microfilm. Reels should be programmed logically. When possible, program the breaks between reels so they occur between volumes, at the end of a year, or at a place that makes sense for your materials, keeping in mind the arrangement of the entire collection. If the vendor is programming the reels, be specific with your instructions on how programming is to be done.

4.6.4. Final Preparation

Prepare an accurate inventory or shipping list for the vendor.

Place all items in boxes for transport to the vendor. Use standard-size boxes, preferably all the same size. Number each box with the name of the office and the box number (e.g., "box 1 of 5," "box 2 of 5," and so on). Identify boxes on ends and sides.

4.7. Targets

Targets are pieces of paper on which certain information is printed. They must be used, to ensure legal standards are met. Identification targets are generally letter- or legal-size pages generated using a word processing program. (See Appendix C for templates and samples of targets.) Roll number, agency origin, and reduction ratio should be eye-legible on exposed film, meaning that you can read this information as it occurs on the film without any magnification.

Targets are necessary to ensure ready access to the information contained on the film and to assist in meeting the requirements of admissible evidence in court. Targets indicate quality, organization, and validity of the microfilmed collection. Film will be rejected if proper targets are not used. If you are using a vendor, they should provide some targets. The targets that a vendor should provide are indicated below with an asterisk (*).

Targets cannot be spliced onto the film. Only one target should be filmed in each frame. There shall be no in-frame targets, except as authorized in writing by the Local Records Program. Targets must be filmed at the same reduction ratio as the materials.

Targets should appear in the following order on the beginning of each reel:

- ❖ **Start***: blank sheet of bond paper with START printed on it.
- ❖ **Uniform Density Target***: plain white sheet of bond paper or non-glossy poster-board free of lines and characters. It must be approximately the same size as the largest documents being microfilmed on the reel.
- ❖ **Camera Operator's Certificate**: must include date, camera operator's name, roll number, county, office, series/record title, inclusive dates for the series, arrangement (for example, "chronological by date"), reduction ratio, and vendor name.
- ❖ **Continued From Last Roll***: if the filming project from the last roll is continuing on this reel.
- ❖ **Reel Number**: use consecutive numbering system for each project.

- ❖ **Title Target:** must include county and/or city, office, records series title, information content, inclusive dates, and arrangement. Also indicate if the records are of a closed or confidential nature. Please consult the appropriate records retention schedule to determine the exact records series title. If there are multiple volumes or boxes on one reel, a title target is necessary before each. (See discussion at "Additional Bibliographic Targets" below.) Also, make sure each volume is indicated separately on the microfilm box label.
- ❖ **Statement on Duplicate Images Target:** blank sheet of bond paper with Duplicate Images text printed on it.
- ❖ **Corrections Target:** blank sheet of bond paper with Corrections text printed on it.
- ❖ **Additional Bibliographic Targets:** varies depending on the collection being filmed but can include Series Title Targets, Volume or Box Targets, or other informational targets as appropriate. If an index or finding aid runs more than about 10 pages, it should appear after the target sequence.
- ❖ **Resolution Test Target*:** consists of a series of horizontal and vertical line patterns with a series of numbers located next to each line pattern. This target must meet the ANSI/AIIM MS51 (also ANSI/ISO 3334) and should be of approximately the same size as the material.

Targets should appear in the following order at the end of each reel:

- ❖ **Continued On Next Roll*:** if the filming project is to continue onto the next reel.
- ❖ **Reel Number:** use consecutive numbering system for each project.
- ❖ **Camera Operator's Certificate:** must include date, camera operator's name, roll number, county, office, series/record title, inclusive dates for the series, arrangement (for example, "chronological by date"), reduction ratio, and vendor name.
- ❖ **Uniform Density Target*:** plain white sheet of bond paper or non-glossy poster-board free of lines and characters. It must be approximately the same size as the largest documents being microfilmed on the reel.
- ❖ **Resolution Test Target*:** consists of a series of horizontal and vertical lines with a series of numbers located next to each line pattern. This target must meet ANSI/AIIM MS51 (ANSI/ISO 3334) and should be of the appropriate size for the material.
- ❖ **End Of Reel*:** blank sheet of bond paper with END OF ROLL – PLEASE REWIND printed on it.

The following targets should appear when retakes are appended:

- ❖ **Start of Corrections/Additions*:** blank sheet of bond paper with START OF CORRECTIONS/ADDITIONS printed on it.
- ❖ **Uniform Density Target*:** plain white sheet of bond paper or non-glossy poster-board free of lines and characters. It must be approximately the same size as the largest documents being microfilmed on the reel.
- ❖ **Resolution Test Target*:** consists of a series of horizontal and vertical lines with a series of numbers located next to each line pattern. This target must meet ANSI/AIIM MS51 (ANSI/ISO 3334) and should be of the appropriate size for the material.
- ❖ *[Film corrections here]*
- ❖ **End of Corrections/Additions*:** blank sheet of bond paper with END OF CORRECTIONS/ADDITIONS printed on it.

- ❖ **End Of Reel*:** blank sheet of bond paper with END OF ROLL PLEASE REWIND printed on it.
- ❖ **Camera Operator's Certificate:** must include date, camera operator's name, roll number, county, office, series/record title, inclusive dates for the series, arrangement (for example, "chronological by date"), reduction ratio, and vendor name.
- ❖ **Uniform Density Target*:** plain white sheet of bond paper or non-glossy poster-board free of lines and characters. It must be approximately the same size as the largest documents being microfilmed on the reel.
- ❖ **Resolution Test Target*:** consists of a series of horizontal and vertical lines with a series of numbers located next to each line pattern. This target must meet ANSI/AIIM MS51 (ANSI/ISO 3334) and should be of the appropriate size for the material.

The following targets should appear as needed on the reel. Some samples appear in Appendix C.

- ❖ **Sections Target*:** a white piece of bond paper with text regarding filming in sections. This target should be used when a document is too large and needs to be filmed in sections
- ❖ **Condition Targets:** a white piece of bond paper with text describing the poor condition. Examples of condition targets include BOOK IN POOR CONDITION, LAMINATED PAGES, and TIGHT BINDING. (See examples in Appendix C of these *Guidelines*.)
- ❖ **Blank Pages Target:** a white piece of bond paper with text such as BLANK Page or PAGES 32-89 ARE BLANK.

4.8. Microfilm Box Labeling

Box labeling is critical. If the information that is permanently preserved on the microfilm is not clearly indicated on the label, it will be useless because users will not know what is contained in the record. It is imperative that you provide your vendor a list of exactly what is to be filmed, and in what order, and require that the vendor make accurate labels.

Sometimes the information on the cover of a book is not what is inside. Make sure to communicate the correct data to your vendor. Label each reel fully: "Deed Books, 1-4, 1884-1910" would not be acceptable. Each book, or series, with specific titles and dates must be clearly stated. (See samples in Appendix D).

Each label must have:

- ❖ Agency Origin, e.g., which political subdivision (county, school district, city, etc.) and office (recorder, clerk, etc.) the information comes from.
- ❖ Description of records filmed on the reel – e.g., minutes, ordinances, student records, etc.
- ❖ How the records are arranged – e.g., A-C or 1910-1915. Even if the records are arranged alphabetically, there **must** be inclusive dates on the label.
- ❖ Indication if an INDEX is filmed at the front of a record (if applicable).

5. **Assistance**

The Local Records Preservation Program of the Missouri State Archives shares your concern for the preservation of vital records in your care. A number of services are available to local government entities, including assistance in planning your microfilm program, in purchasing microfilm equipment, and in storing microfilm masters. For more information about the services available, please contact the Local Records Division:

Missouri State Archives
Local Records Preservation Program
Office of the Secretary of State
P. O. Box 1747
Jefferson City, MO 65102
(573) 751-9047
local.records@sos.mo.gov
<http://www.sos.mo.gov/archives/localrecs/program.asp>

The website is a good source of up-to-date information. The latest version of these *Guidelines for Microfilming Public Records* can be located on the website. The website also lists vendors of microfilm services and equipment at <http://www.sos.mo.gov/archives/localrecs/conservation/vendor/microfilm.asp>. The website also includes record retention schedules at <http://www.sos.mo.gov/archives/localrecs/schedules/>, so you can identify permanent record series that qualify for LR grant funding.

Appendix A: Contracting for Services

Working with a microfilm vendor can sometimes be challenging. Most microfilming vendors exist to film short-term business records with a goal of space-savings. By contrast, preservation microfilming requires vendors with a view to long-term preservation and a stringent adherence to strict national standards. Communication with the vendor is crucial, to be sure the vendor can meet your long-term goals.

The most important factor in a successful project is a positive relationship with your vendor. Communication is critical to a positive relationship. The first step is to give your vendor a copy of these guidelines in their most up to date version (check our website at <http://www.sos.mo.gov/archives/pubs/mfmg/>). The vendor should be made aware that you want preservation microfilm, not typical business microfilm that will not meet these standards (see Section 4.0 above). The quality control requirements should be clear and agreed upon before you discuss price with the vendor.

In order to assist local government in obtaining archival quality microfilming services from a vendor, the Records Management and Archives Services recommend the following guidelines:

- Request that the vendor provide you a list of references, and contact at least three clients from the list. Make sure that you ask the references when their project was done, and ask enough questions about their projects to make sure they were similar to yours. Make sure that you contact any references that are government entities similar in nature to your own.
- If your government agency has received a grant from the Local Records Program, consult the grant award letter or contracts for any special stipulations about your microfilming project, and convey these to your vendor before entering into a firm agreement.
- Request a cost estimate. This would be a good time to give the vendor a copy of these Guidelines. If you are filming under an LR grant, also give the vendor a copy of any special stipulations in your grant contract. Be specific about what services you want and about what type and what condition of materials you have.
- Request a time estimate for completion. Tell the vendor if you have a deadline by which the project must be complete. If your project is a Local Records grant project, do not forget to leave yourself time to inspect the film, write your final report, and submit it to the Local Records grant administrator by the deadline.
- Inform the vendor about the indexing system you prefer and the information that should be included on the labels (e.g., roll numbers, title targets, new file begins, etc.). See samples in Appendix D.
- Ask questions, such as
 - ❖ Will documents be filmed on-site? If not, who pays for boxing the documents and transportation to the vendor's site? Who is responsible for loss or damage in transit? Is the vendor insured against damage or loss? Are vendor personnel insured during filming conducted at your site?
 - ❖ Will the vendor provide all services or will parts of your project be subcontracted to another vendor? If the vendor plans to use a subcontractor, they must notify you.
 - ❖ What type of security do they have at their facility? Ask what systems are in place to protect material from theft, fire, or other disasters.
 - ❖ What type of material handling skills do their staff members have? Ask them to describe the training that new staff members are given.

- ❖ Do they offer a polysulfide treatment option?
- ❖ What reduction ratio do they plan to use for your collection? (They will need to know the material dimensions.) You will need to check your reader or reader/printer to determine if you will need to purchase a new lens to view that reduction ratio.
- Confidential or closed records require special protection, and archivists in the Local Records staff can provide you with special guidance. Be sure that the vendor treats your records in a confidential manner. Discuss your expectations with the microfilm vendor.
- Contact more than one vendor. Decide which vendor seemed most sensitive to your needs and most experienced with your type of materials.
- Send the vendor three copies of the letter of agreement (see Appendix D), and request a contract. The contract should state that:
 - ❖ Film will be manufactured and processed according to archival quality standards established by the American National Standard Institute (ANSI) and International Standards Organization (ISO). (See Appendix B.) If for any reason the films do not meet applicable ANSI and/or ISO standards, the vendor will re-film the records at no additional cost to you.
 - ❖ Each roll will meet established legal and image quality requirements as established and referenced in this guideline.
 - ❖ If retakes (corrections or additions) are necessary, the vendor will re-film and splice the retakes onto the end of the proper roll with the proper targets. If the retakes are necessary as a result of vendor error, this will be done at no extra charge.
 - ❖ The price will include the cost of the film stock, the filming labor, processing, and a duplicate roll. (Note: Films should be clearly marked as to which is the original and which is the duplicate.) If you have requested additional services, such as preparation, make sure that this is included as well.
- **If the vendor does not wish to enter into a written contract, it may be because of an inability to meet some or all of the requirements. This should be a warning sign to you about the capability of the vendor. If the vendor will not sign a written letter of agreement, then you should explore why they are hesitant to sign the agreement and carefully assess your options.**

Note: Microfilming funded by the Local Records Grant Program must also adhere to RSMo 109.241, the State Archives' interpretation thereof, and additional guidelines promulgated by the Missouri Historical Records Advisory Board. Call 573-751-9047 or contact the Local Records Preservation Program for further details.

Appendix B: Standards and Guidelines

When the published standards and guidelines listed here conflict with the technical requirements explicit in this document, this document should prevail.

Core Resources

The resources listed here are particularly comprehensive and important. These are especially useful for officials/agencies just beginning to launch a preservation microfilming project.

ANSI/AIIM MS23-2004. *Standard Recommended Practice - Production, Inspection, and Quality Assurance of First-Generation, Silver Microforms of Documents.*

Elkington, Nancy E., ed. *RLG Archives Microfilming Manual.* Mountain View, CA: Research Libraries Group, 1994.

Elkington, Nancy E., ed. *RLG Preservation Microfilming Handbook.* Mountain View, CA: Research Libraries Group, 1992.

Fox, Lisa L., ed. *Preservation Microfilming: A Guide for Librarians and Archivists.* Chicago, IL: American Library Association, 1996.

Additional Resources

These standards and guidelines can be purchased through their publishers. We recommend visiting the websites of the International Standards Organization, the American National Standards Institute, the Association of Information and Image Management, the Research Libraries Group, and the American Library Association.

ANSI/AIIM MS18-1992 (R1998). *American National Standard – Micrographics – Splices for Imaged Microfilm – Dimensions and Operational Constraints.*

ANSI/AIIM MS34-1990. *American National Standard Dimensions for 100-Foot Reels for Conventionally Threaded Processed 16mm and 35mm Microfilm.*

ANSI/AIIM MS43-1998. *American National Recommended Practice for Operational Procedures/Inspection and Quality Control of Duplicate Microforms of Documents and From COM.*

ANSI/AIIM MS45-1990. *American National Recommended Practice for Inspection of Stored Silver-Gelatin Microforms For Evidence of Deterioration.*

ANSI/AIIM MS48-1999. *American National Standard for Information and Image Management – Recommended Practice – Microfilming Public Records on Silver Halide Film.*

ANSI/AIIM MS51-1991 or ANSI/ISO 3334-1991. *Standard for Information and Image Management – Micrographics – ISO Resolution Test Chart No. 2 – Description and Use.*

ANSI/NISO Z39.62-2000. *Eye-Legible Information on Microfilm Leaders and Trailers and on Containers of Processed Microfilm on Open Reels.*

ISO 18901:2010(E) . *Imaging Materials - –Processed Silver-Gelatin-Type Black-and-White Films - Specifications for Stability.*

ISO 18902:2007(E). *Imaging materials – Processed imaging materials – Albums, framing and storage materials*

ISO 18906:2000(E). *Imaging materials – Photographic films – Specifications for safety film.*

ISO 18911:2010(E). *Imaging materials – Processed safety photographic films – Storage practices.*

ISO 18916:2007(E). *Imaging Materials - Processed imaging materials - Photographic activity test for enclosure materials.*

ISO 18917:1999(E). *Photography - Determination of residual thiosulfate and other related chemicals in processed photographic materials - Methods using iodine-amylose, methylene blue and silver sulfide.*

Appendix C: Sample Targets

Caveat regarding Sample Targets: Throughout this “Sample Targets” section, several targets are provided in two formats.

Targets labeled “template” may be used as document templates to create a government office’s own targets. These templates have been created in layouts and font sizes that will conform to these *Guidelines*.

Sample targets are labeled “example only.” They have been created to show how a fictional agency might use such a target. None of these “example” targets should be photocopied and used; all require modification for use in a microfilming project.

START

Camera Operator's Certificate

VENDOR NAME

Microfilmed at Vendor City, Vendor State

Date:

Camera Operator:

Roll No.:

County/City:

Office:

Series/Record Title(s):

Inclusive Dates:

Arrangement:

Reduction Ratio:

Funded in part by the
Local Records Preservation Program
Missouri State Archives
Jefferson City, Missouri

Camera Operator's Certificate

MICROFILM COMPANY Q

Microfilmed at St. Louis, Missouri

Date: 6/10/2004
Camera Operator: Susie Q
Roll No.: 2004-DR10
County/City: Rose County
Office: County Collector
Record Series Title: Real Estate (Land) Tax Books
Inclusive Dates: 1875 through 1997
Arrangement: Chronological by collection year,
then by section, township, and
range.
Reduction Ratio: 12:1

Funded in part by the
Local Records Preservation Program
Missouri State Archives
Jefferson City, Missouri

**CONTINUED
FROM LAST
ROLL**

C.4: Reel Number Target

ROLL #

ROLL #
EXAMPLE ONLY
2004-DR10

TITLE TARGET

Missouri Local Records Preservation Program Grant Project

COUNTY/CITY:

OFFICE:

RECORD SERIES TITLE:

INFORMATION CONTENT:

DATES (Inclusive):

ARRANGEMENT:

CONFIDENTIAL: YES NO

CLOSED: YES NO

TEMPLATE

TITLE TARGET

Missouri Local Records Preservation Program Grant Project

COUNTY/CITY: Rose County

OFFICE: County Collector

RECORD SERIES TITLE: Real Estate (Land) Tax
Books

INFORMATION CONTENT: This records series contains information relating taxes collected for land ownership. An alphabetical index accompanies this record.

DATES (inclusive): 1875 through 1997

ARRANGEMENT: Chronological by collection year, then by section, township, and range.

CONFIDENTIAL: YES NO

CLOSED: YES NO

STATEMENT ON DUPLICATE IMAGES

This reel of microfilm contains material that has paper color changes, stains, or illustrations (some of which may appear on pages mixed with printed text). In order to ensure that all text and illustrations are legible, exposure settings must be changed. Therefore, when text and illustrations exist in a single image or when material backgrounds differ, such frames may be exposed twice on the microfilm copy.

The first exposure reflects the camera operator's best effort to capture the majority of the text. The second exposure reflects the camera operator's best effort to capture illustrative material or the remaining text. It is hoped that this practice will result in a microfilm product that fully serves the needs of most researchers.

STATEMENT ON CORRECTIONS

Materials discovered to be missing in the microfilm, or other corrections found to be needed, may be added to the end of the reel.

Researchers should always check the end of the reel for corrections.

Record Series Title
Volume #, Letter, or Box #
Begin Date – End Date

REAL ESTATE (LAND) TAX BOOKS

Volume 14

EXAMPLE ONLY

Jan. 1, 1875 – Dec. 31, 1875

**CONTINUED
ON NEXT
ROLL**

**END OF
ROLL**

**PLEASE
REWIND**

START OF CORRECTIONS / ADDITIONS

END OF CORRECTIONS / ADDITIONS

THE FOLLOWING
DOCUMENT HAS
BEEN FILMED IN
SECTIONS TO
INSURE
READABILITY.
SECTIONS
OVERLAP.

BOOK IN POOR CONDITION

C.15: "Blank Pages not Filmed" target

PAGES
ARE BLANK

TEMPLETE

**PAGES 32-89
ARE BLANK**

Appendix D: Sample Forms

INDEX OF MICROFILM CONTENTS

OFFICE	City of Clement	VENDOR	Acme Micrographics
COUNTY	County of Rose	DATE	November 21, 2006
CITY	City of Clement	PAGE	_1_ OF _1_

BOX # or BOOK#	ROLL#	RECORDS SERIES TITLE	# OF PAGES	REDUCTION RATIO	SHEET SIZE	NOTES
Box 1 of 2		Ordinances	1,500			
Box 2 of 2		Ordinances	1,000			
Box 1 of 2		Building Permits	500			
Box 2 of 2		Building Permits	500			
Box 1 of 1		Resolutions	400			
Box 1 of 3		Board of Aldermen Meetings	3,200			
Box 2 of 3		Board of Aldermen Meetings	3,100			
Box 3 of 3		Board of Aldermen Meetings	3,000			
Box 1 of 1		Board of Aldermen Executive Session Meetings	600			
Box 1 of 4		General Ledgers	4,500			
Box 2 of 4		General Ledgers	4,500			
Box 3 of 4		General Ledgers	4500			
Box 4 of 4		General Ledgers	4,500			
Box 1 of 1		Cemetery Register & Cemetery Maps	1,750			
Box 1 of 2		City Cemetery Internment Record Cards	7,500			
Box 2 of 2		City Cemetery Internment Record Cards	6,000			
Box 1 of 1		Board of Adjustment Minutes	1,000			
Box 1 of 1		Planning & Zoning Minutes	750			
Box 1 of 1		Audit Reports	4,500			

D.2: Labels

Microfilm Box Label

Microfilm box labels should have the dimensions indicated here:

- label width: 3 3/8" (8.5mm)
- label height: 4 13/16" (12.2mm)
- distance from top border to first line: 1.6mm
- distance from 1st to 2nd line: 1.9mm
- distance from 2nd to bottom line: 8.6mm

Microfilm Labels for Bound Volumes

TEMPLATE

ROLL NUMBER		
COUNTY/CITY OFFICE		
SERIES TITLE	<u>VOL.</u>	<u>RANGE</u>
TITLE/CONTENT	BOOK #	DATES
TITLE/CONTENT	BOOK #	DATES

SAMPLE

C 48353		
ROSE COUNTY RECORDER OF DEEDS		
DEED RECORDS	<u>VOL.</u>	<u>RANGE</u>
Warranty	441	May 1939 - Feb 1940
Mortgage	442	Nov 1939 - Mar 1941

Microfilm Labels for Unbound Records

TEMPLATE

ROLL NUMBER			
COUNTY NAME			
OFFICE			
SERIES TITLE			
BOX #__	FOLDER #	DATE	CONTENT
<i>THRU</i>			
BOX #__	FOLDER #	DATE	CONTENT

SAMPLE

C 48678			
ROSE COUNTY			
CIRCUIT COURT			
CASE FILES			
BOX #32	FOLDER #55	1860	
<i>THRU</i>			
BOX #33	FOLDER #74	1867	

D.3: Quality Control Report

Missouri State Archives/ Local Records Preservation Program Quality Control Report

Institution: _____

Preservation Microfilming Project: _____

Filming Agent: _____

MASTER NEGATIVE STORAGE NUMBER _____ Exposures _____

RECORD _____ BOX _____ FOLDERS _____

1. FILMING

Technician (Initials) _____ Camera: _____ Filming Date(Mo/Day) _____

Pg# _____ Reduction Ratio _____

Image Orientation _____ Required changes in orientation or reduction? _____

2. INITIAL QUALITY CONTROL

Processor (Initials) _____ Inspector (Initials) _____ Processing Date _____

Density Readings 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ Avg. _____

Resolution pattern required _____ Highest Resolution pattern Read _____

3. FILMING ERRORS (give page/frame numbers)

Overexposed images _____ Density: _____

Underexposed images _____ Density: _____

Focus defects _____ Cause: _____

Obstruction in frame _____ Cause: _____

Streaks _____ Fogging: _____

Other _____

4. PHYSICAL DEFECTS (give page numbers)

Fingerprints _____

Scratches _____

Water Spots _____

Dust/Dirt etc. _____

Other/Comments _____

5. ACTIONS TO CORRECT DEFECTS

Refilming whole title ? _____ Refilming of page(s) list _____

Splices needed (number) _____ Number of exposures refilmed _____

Other action/comments _____

6. APPROVAL FOR VARIANCE FROM PROJECT SPECIFICATIONS

Variant density (check) _____ other ? _____

Variance approval of Project Manager (initials) _____ Date: _____

7. CERTIFICATION OF REPORT

Filming Agent (Initials) _____ Date: _____

Project Manager (Initials) _____ Date: _____

Reel Filmed by: _____

Density & Resolution by: _____

Frame-by-Frame Insp'n by: _____

Corrections spliced by: _____

LARGE DOCUMENTS CAN BE FOUND IN OVERSIZED STORAGE

Location: _____

Box: _____

Folder: _____

of Items: _____

D.5: Sample Letter of Agreement

Sample Letter of Agreement

<Date>

<Name>

<Microfilm Company>

<Address>

Dear <Name>:

I am pleased to say that you have been awarded our microfilming project: **<insert project name>**. In order to proceed with this project, we ask that you sign the three copies of this letter of agreement, which I have already signed. Please keep one copy for your files, and return the other two to me. I will forward one copy to the Local Records Program of the Missouri State Archives for their grant records.

This letter serves as an agreement that you understand that this project is part of the Local Records Preservation Grant Program and therefore must follow the guidelines set forth by that agency. Those guidelines can be found on the Internet at <http://www.sos.mo.gov/archives/pubs/mfmg/>. The Local Records Program also requires that your company perform all the work as discussed in the estimate. Subcontracting is only allowed with written notification and acceptance by my office. As part of the requirements for this grant program, microfilm will not be accepted and payment will not be made until the Local Records Program completes its quality control and determines that the film meets the requirements of their specifications.

We would also like to sign a formal contract with you for this project. Please send us your standard contract for review.

Thank you for your assistance in preparing for this project. We look forward to the project start. We plan to **<deliver the materials or ship the materials or have the materials ready>** on **<date>**. Please let me know when you plan to begin the filming.

Sincerely yours,

<Name>

<Government office/agency>

<Address>

Appendix E: Grant Project Workflow

To those who have received a grant from the Local Records Preservation Program involving the production of microfilm, congratulations! The information provided in this guideline will be very important to implement a smooth grant project. Most importantly, before you begin **any** microfilming, fill out and return the "Microfilm Information Sheet" provided in your award packet. This will inform the Local Records Grant Administrator (573-751-2798) which vendor you plan to use for your microfilming. *We can discuss the project with the production staff selected to do the filming (not the sales representative) so that a clear understanding of all standards, specifications, and expectations will be established before the project begins.*

LR grant recipients should also complete and sign a letter of agreement with the chosen vendor. (See sample in Appendix D).

WORKFLOW FOR MICROFILM PRODUCED FOR A LOCAL RECORDS GRANT PROJECT

- 1) Grant awarded by the Secretary of State upon recommendation of the Missouri Historical Records Advisory Board (MHRAB).
- 2) Microfilm Information Sheet and Letter of Agreement completed.
- 3) Local government agency prepares/processes records for microfilming. The work may be done by agency staff and/or volunteers, professional consultant, or vendor.
- 4) Vendor microfilms records, develops them, inspects them, and creates duplicates.
- 5) Vendor sends master (original) silver film and associated quality-control report form to Local Records. Work copies should be sent to grantee.
- 6) Local Records staff enters film into database as being received.
- 7) Local Records staff performs quality-control inspection on master microfilm
 - a. If master microfilm passes Quality Control Inspection, then
 - i. Film released from grant authority when project is complete and
 1. Film is returned to government office.
 2. Or, retained by Archives, labeled, and stored.
 - ii. Silver duplicate made—labeled and stored.
 - iii. Silver or Diazo duplicate made—labeled and goes to Archives Reference.
 - b. If master microfilm does not pass Quality Control Inspection, then film is
 - i. Returned to vendor for re-filming

Grant recipients are notified by postcard whether film is accepted or rejected. The quality control inspection effort of the Local Records Program may reject any reel of film that does not meet the standards and specifications of these *Guidelines*.

Because of the requirements under which the Local Records Program operates, we will not be able to grant any funds for a project which we judge has not met the quality control standards. In the unlikely event there is a situation where grant funds have already been expended by the agency or office for microfilm that does not meet standards, that agency or office will replace the sub-standard film at their expense or reimburse all grant funds to the Local Records Program.

Local government agencies may also request subsequent diazo-film reference copies at any time for direct cost -- currently \$15.00 per reel.

Appendix F: Glossary of Terms

ANSI: American National Standards Institute – a federation of trade associations, technical societies, professional organizations, consumer groups, and private companies that develops national standards, including those that govern the creation of permanent microfilm.

Archival Master (also AM, Archival, Master Negative, Camera Negative, or first generation film): The film used in the camera during filming. When manufactured, processed, and stored in accordance with national standards, this film should achieve a Life Expectancy (LE) of at least 500 years. See also *print master* and *service copy*.

Baseline Filming: Microfilming practice in which operators position documents so that the lower edge of all pages on a reel appear at approximately the same distance from the edge of the film.

Bleed-Through: An effect caused when ink has migrated, generally due to the porousness of the paper, from the surface of a sheet of paper to the surface of the verso.

Blurred Frame: An image on the film that is out of focus. Generally occurs when the cradle or pages are moving during filming, the camera experiences a focus problem.

Brittle: Describes paper that breaks or cracks when folded or bent. Paper that is acidic as a result of its manufacture becomes brittle as a result of a chemical reaction.

Cine (or Position A): Defined as the placement of source materials so that their bottom edges of frames or pages are perpendicular to the long edge of the microfilm. See also *Comic*.

Collate: To review an item to ascertain whether it is complete and in the correct order. Other conditions that may be noted during collation include damaged pages or bibliographic irregularities (such as irregular volume/issue numbering, pagination, or title changes). It may also be useful to note foldouts or other unusual features that the camera operator may need to prepare for, and also to keep track of the number of pages present, which can be used for *reel programming*.

Comic (or Position B): Defined as the placement of source materials so that their bottom edges of frames or pages are parallel to the long edge of the microfilm. See also *Cine*.

Condition Target: Usually an *eye-legible target*, inserted in the target sequence, describing unusual or specific conditions for that title or reel.

Contrast: An expression of the relationship between text and background of material or between the high and low *density* of a photographic image. See also *high contrast*, *medium contrast*, and *low contrast*.

Cradle (or Book Cradle): A device that supports bound volumes for microfilming (under glass) in a position so that pages are open flat under the lens of the camera.

D-Max (Maximum *Density*): A measurement taken on the dark area of the film; used on Archival, Print Master, and Service Copies. Dmax must fall within a specified range dependent on material type and film type.

D-Min (Minimum *Density*): A measurement taken on the light/clear area of the film; used on Archival and Print Master. Dmin must fall within a specified range dependent on film type.

Densitometer, Transmission: Piece of equipment used to inspect microfilm to measure the amount of light able to pass through the film. This equipment is used to measure *density* during the Quality Assurance process.

Density: A measure of the amount of light able to pass through the film. See also *densitometer, transmission and uniform density target*.

Duplicate (or Dupe): To make copies of microfilm, from the *archival master or print master*. Also used to refer to the reels that have been duplicated (*Print Masters and Service Copies*).

Duplicate frame: the appearance of an identical *frame* on film due to operator error. See also *Intentional Second Exposure*.

Eye-legible Target: Refers to a *target* that can be read by the human eye on microfilm without magnification. In order to achieve this, it is necessary for a *target* to be printed in a font size of at least 60 pts.

Fade (or Background *Density*): The background darkness or color of a page.

Fade Changes: Fades that vary from one page of text to another or within the same page.

Flag: Narrow strip of paper inserted in a volume, generally to alert the camera operator to film a particular *target* or to provide instructions for filming.

Fog: A dark patch on film that can be caused by stray light during film manufacture, exposure, or loading/unloading.

Frame: Each exposure on film is referred to as a frame.

Generation: One of the successive stages of duplication (see *duplicate*) of an original or a master.

Gutter Glare: A reflection from the camera lights that appears in the inner margin of the book if volume is too tightly bound, is too thick or is printed on glossy paper. Gutter glare can sometimes obscure text to the point of illegibility on microfilm.

Gutter Shadow: Shadow that appears in the inner margin of the book if volume is too tightly bound or is too thick. Gutter shadow can sometimes obscure text to the point of illegibility on microfilm.

High Contrast: 1. Film in which the light and dark areas are represented by extreme differences in density. Most black and white film is high contrast film. 2. Material that is easily readable and has bold or clear text. See also *medium contrast* and *low contrast*.

In-frame Target: A sheet of paper with technical or explanatory information, which is small in size and appears in the same frame with the document being filmed. Cf. "Target."

In-frame targets are not to be used in microfilm produced with grant funds from the Local Records Program.

Intentional Second Exposure: Second exposure of the same page(s) taken intentionally in order to capture the most legible image of everything in the frame, usually for a *fade change*, photograph or illustration.

Leader: Clear film added to the front of each reel. Used for protection of images from *fog* and handling *scratches* and for threading into micrographics equipment.

Light Balance: Equal amounts of light appearing in all areas of a frame. Achieved by positioning camera lights so that there is an even background *density* across the entire frame.

Light Box: Translucent box with a light inside, designed to provide evenly dispersed illumination. Used to check film for *scratches* or other flaws.

Loupe: Small hand-held magnifying glass used to inspect film over a *light box*.

Low Contrast: 1. Film in which the light and dark areas on a frame are represented by small differences in density. 2. Material that has little or no contrast between text and background – often difficult to read. See also *high contrast* and *medium contrast*.

Medium Contrast: 1. Film in which the light and dark areas on frame are represented by moderate differences in density. 2. Material that is legible, with moderate contrast between text and background; onionskin paper and type written material usually fall into this category. See also *high contrast* and *low contrast*.

Microscope: A 100X microscope is used to check the *resolution target* patterns.

Orientation (or Position): The position of the camera head in relation to the material being filmed. See also *Comic* and *Cine*.

Print Master (also PM, duplicate negative, or second generation film): This film is duplicated from the *archival master* and is used to create *service copies* of the film. See also *archive master* and *service copy*.

Reduction Ratio: Relationship between the size of the original document and the size of the microfilmed image. Generally referred to with an "X". 12X represents the reduction ratio 12:1. Example: 12X or 12:1 means the size of the image on film will be 1/12th the actual size of the original document.

Reel: 1. A physical roll of film. 2. Informally used to refer to the corresponding original material that is contained on a reel of film.

Reel Programming (or reel breaking): Determining what material is to be filmed on a given reel. This can be done before beginning filming, or at camera during filming.

Resolution: A test that measures whether the film captured the fine detail or clarity of the document.

Resolution Target: A target that is filmed so that the optical performance of the microfilm equipment can be measured. Consists of a series of successively smaller patterns with

alternating black and white line pairs. Each pattern contains both vertical and horizontal line pairs and is numbered – the smaller the pattern, the higher the number.

Scratch: Damage that occurs when film is inadvertently scraped. Can be caused by improper handling or malfunctioning equipment, and can occur on either the emulsion or the polyester base.

Service Copy (also SC, Positive Copy, or third generation film): The copy of the microfilm that will be used by readers. Generally a positive service copy is made. See also *archive master* and *print master*.

Skew: The degree to which the image that appears on film is “off-square” from the film. Skew is measured from the two corners of the document image parallel to the longitudinal edge of the projected image frame.

Splice: A joint made by ultrasonically welding two pieces of film together so they will function as a single piece. Splices can also be made using tape, ultrasonic welding, or thermal methods. However, tape splices do not meet preservation guidelines.

Splicer: A device for joining strips of photographic film.

Target: Used throughout a reel to convey information a future reader might need (such as a bibliographic record target or a copyright target) or to provide a basis for quality testing of the film (such as a *resolution target* or *uniform density target*).

Tie-Wrap (or Button and String Tie): An acid-free covering that protects a reel of microfilm.

Trailer: Clear film added to the end of a reel. Used for protection of images from *fog* and handling *scratches* and for threading into micrographics equipment.

Uniform Density Target: A single sheet of clean white bond paper or card stock, filmed at the beginning and end of every reel. The target should completely fill the image area and its primary function is to verify light balance.